IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:	Confirmation No.: 4925
Stefan Frenzel, et al.	Date: December 29, 2010
Serial No.: 10/539,781	Group Art Unit: 1732
Filed: September 20, 2005	Examiner: Colette B. Nguyen

For: EXTRACTION OF INGREDIENTS FROM BIOLOGICAL MATERIAL

VIA EFS-WEB
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

REPLY BRIEF UNDER 37 C.F.R. §41.41

Sir:

This Reply Brief responds to the Examiner's Answer dated November 3, 2010. For the sake of clarity and conciseness, the following discussion responds to the issues raised by the Examiner in essentially the same order as they are set forth in the Answer.

In discussing the rejection of claims 1, 2, 6-12, 15, 16, 18, 19, 21, 27 and 28 under 35 U.S.C. §103 over Sanders (USP 6,656,287) in view of Schultheiss, *IEEE Transactions on Plasma Science* (¶2), the Examiner states (p. 4) that Sanders discloses a process involving alkaline treatment with lime to raise the pH up to 12.5 "to enable certain non-sucrose substances contained in juices to decompose and to reach their respective iso-electric point. The process of alkaline treatment of Sanders can be added to, replace or modify conventional methods and apparatus used to process sucrose-containing liquids with the advantage of using less lime or other bases for the purpose of clarify or purify [*sic.*, clarifying or purifying] the juice that is commonly practiced." (emphasis supplied by applicants). Thus, the Examiner's own words make it abundantly clear that Sanders involves an alkaline treatment of the extracted juice. In contrast, in the presently claimed method one first removes the juice from the biological material (i.e., the plant material), after which the biological (i.e., plant) material from which juice has been removed, is subjected to alkaline extraction to remove additional juice from said material.

Next, in the portion of the Answer bridging pp. 4-5 the Examiner alleges that the disclosure contained in Schultheiss that it is "preferable to treat entire beets" stands for the proposition that the biological material remains substantially unaltered in its form and character. With due respect, applicants submit the Examiner's conclusion is not supported by the teaching of the reference. That is, Schultheiss specifically addresses a "treatment" of biological material. This does not rule out that the biological material that is treated, be it entire beets or portions/pieces of such beets, is therein altered, due to the effect of the treatment, in its form and character. Applicants respectfully submit, therefore, that the Examiner's interpretation of Schultheiss is based on nothing more substantive that a reconstruction supported by a hindsight reliance on applicants' own teachings as contained in the present specification.

Continuing on p. 5, the Examiner returns to a discussion of the alkalinity treatment as described in the Sanders reference. The Answer states that, "The alkalinity treatment of Sanders . . . . can be done at anytime, in this case it is used after diffusion (equivalent to step b of the claim) and it is applied to the extracted liquid which still has solid particles, flocculants which may be subjected to subsequent process steps." As applicants have previously pointed out to the Examiner, however, during the prosecution of this application, step b of the claimed method does not recite a diffusion extraction as the Examiner is saying. In fact, the only diffusion extraction recited in, e.g., applicants' independent claim 1 and 18 takes place in step c, not in step b.

Continuing, on p. 5 applicants submit that there is simply no basis of support for the Examiner's statement that, "And from the teachings anyone with ordinary skill in the art can apply the alkalinity treatment to the liquid or to the solids separated from the first step to further extraction of the juices. As biological material can be a solid as well as a liquid and the alkaline treatment can be applied either to the juice or to the materials as discussed by applicant[s] in paragraph 26 of the applicant's specification." In Sanders the alkaline treatment is carried out on the extracted juice (the extract) in order to purify such juice, not on the solid biological material, as it is in applicants' claimed method, in order to extract additional ingredients from such solid material. The Examiner, with due respect, appears to be confusing the concept of "extraction" , i.e., the transmission of contents from solid matter across a phase interface (solid-liquid) into a liquid extractant – which is what the applicants are doing, with pressing, i.e., as practiced by Sanders, which constitutes a separation (i.e., of juice from plant material) by mechanical means.

Thus, there is no basis for alleging that the teachings of Sanders would disclose, or even suggest, to one having an ordinary level of skill in this art, to carry out an alkaline treatment of anything else except the juice already removed from the plant material, i.e., for the purpose of purifying/clarifying the juice – and especially not the "biological material" as that term is used by applicants in the present specification and claims. While it may be true that, speaking generally, a biological material can be a solid or a liquid, this is not the case with regard to the "biological material" referred to in applicants' specification and claims, for which applicants have provided a rather specific definition. One may begin by looking at the wording of the claims themselves. That is, using claim 1 as an example, following the separation (i.e., of cell juice) from the 'electroporated biological material' in step (b), the claim recites, "subjecting the electroporated biological material from which the cell juice has been separated off in step (b) to an alkaline extraction treatment ... ". Applicants submit that it could not be more clear that "biological material" as referred to in applicants' claims, could only be the plant material that is 'left behind' after the cell juice released by the electroporation treatment is separated off.

However, lest the Board still not be convinced that it is the plant material left behind following electroporation that is subjected to the diffusion extraction treatment recited in step c of independent claims 1 and 18, the Board's attention is respectfully directed to the following locations in applicants' as-filed specification which clearly and unambiguously teach that the "biological material" as referred to by applicants is the solid, electroporated plant material, and not the liquid juice separated from the plant material due to the electroporation, i.e., paragraphs [0008]; [0009]; [0010]; [0017]; [0018]; [0019]; [0020]; [0021]; [0026] – [0030]; [0031]; [0034]; [0035]; [0040]; [0062] and [0074]. One of ordinary skill in this art, therefore, having read the indicated paragraphs, would find that the "biological material" that is subjected to a diffusion extraction in step c of independent claims 1 and 18 can only be the plant material which has been electroporated to release the cell juice therefrom. As noted above, moreover, in direct contrast to what is taught and claimed by applicants, the prior art Sanders reference teaches to subject the cell juice to an extraction, i.e., to clarify and purify the juice,. This step (of extracting the juice) is totally uncalled for, however, in applicants' claimed method and apparatus.

Continuing with applicants' refutation of the Examiner's arguments, in ¶17 on p. 9 of the Answer, wherein the Examiner is dealing with the rejection of applicants' claims 4, 5, 14, 17 and 21-24 under 35 U.S.C. §103, it is alleged that 'Eugene et al.' (WO 01/62482) discloses a screw

conveyor. Applicants respectfully submit, however, that this is not correct, i.e., the reference does not disclose a screw conveyor. Instead, the reference discloses *inter alia* a screw press. The differences between a "screw press" (prior art) and a "screw conveyor" (recited in applicants' claims) are described in detail, e.g., in applicants' Amendment filed on October 6, 2009 (see, e.g., pp. 11-12 and Attachments A and B). In summary, the reference describes apparatus wherein the biological material is treated in such a manner that it is significantly altered in its form and character in that several pressing means are taught, including a filter press (see figures 1-4); a spindle press (figure 5A); a screw press (figure 5B) and a band press (figure 6) wherein a "filter cake" (a "gateau" in the original French text) is obtained in every instance once pressing takes place.

It is important to comprehend the distinction between a screw press as taught by the reference, which is used for pressing, and a full screw conveyor which is taught and claimed by the applicants for conveying the biological material (without significantly altering the material in its form and character). A full screw, as used by applicants, does not press the biological material. Rather, it serves to simply convey the biological material from one location to another. A screw press (as taught in the 'Eugene' reference) on the other hand, contains material in a confined volume, which volume is reduced as the material passes through the press that, true to its name, presses the material, i.e., into a filter cake. In contrast, a full screw as claimed by applicants, does not decrease the space available for the material thus conveyed and thus it does not exert pressure on the material such that the material is 'pressed'.

Applicants in their October 6, 2009 Amendment thus provided the Examiner with schematic drawings illustrating examples of full screws for comparison against the screw press shown in figure 5B of the Eugene reference. Copies of the respective Attachments A & B providing this comparison were, moreover, appended at the end of applicants' Appeal Brief filed August 12, 2010 for the Board's consideration. It is apparent, therefore, from the discussion above, that an apparent misconception on the part of the Examiner has caused her to cite Eugene as disclosing applicants' 'screw conveyor' when, in fact, the reference discloses no such screw conveyor and, in fact, actually discloses a 'screw press' which, as noted above, clearly does alter the biological material in its form and character, i.e., by pressing it into a filter cake.

Further to the above, the Examiner additionally states in ¶17 on p. 9 that Eugene discloses only a 'moderate' pressure, essentially ranging between 1.105 Pa – 30 Pa and that it is

unnecessary to use pressures during mechanical pressing with a screw press. The Examiner, moreover, alleges that the claimed pressure of 0.5 Mpa is within the range disclosed in the Eugene reference. In contrast, however, on p. 13 of the Answer the Examiner states that, "the pressure of Eugene's screw conveyor is a lot less than the applicants' screw conveyor." The latter statement, therefore, appears to directly contradict the Examiner's conclusion as set forth on p. 9.

Still further, applicants refer to the Examiner's statement quoted above from ¶17 on p. 9, i.e., that "it is unnecessary to use pressures during mechanical pressing. (Page 2) with a screw press". The basis of this conclusion is not apparent to applicants from either the teaching provided in the cited reference (Eugene) or the arguments provided by the Examiner. In fact, the reference recites a whole variety of pressing means (screw press, filter press, band press, etc.) as an essential feature of the teaching. All of these means are disclosed as performing a "pressing" function. How then, can such pressing be achieved without the use of pressure, as suggested by the Examiner? There is simply no basis for this statement.

Beginning in §10 on p. 9 of the Answer, the Examiner addresses four arguments, identified as A, B, C and D set forth in applicants' Appeal Brief filed August 12, 2010. The following remarks, therefore are provided in response to these comments by the Examiner.

To begin with, in the portion bridging pp. 9-10 the Examiner states, *inter alia* that applicants' claimed method involves "the alkaline treatment (that Sanders discloses)'. This statement is demonstrably incorrect for the reasons previously presented herein. That is, as demonstrated above, Sanders discloses an alkaline treatment of the cell juice removed from the biological material, i.e., for purposes of removing materials therefrom. In contrast, however, applicants' method, as taught and claimed, involves as already demonstrated an alkaline extraction of the biological material, i.e., constituted of the plant material that remains following the electroporation-induced removal of the plant juice in a previous step.

Further on p. 10 the Answer states that "the language of 'biological material' does not mean exclusively that the material is a SOLID . . . ". In response to this statement, the Board is respectfully invited to consider the arguments made above which are believed to prove that the term "biological material" as used by applicants clearly refers to the plant material that remains behind following electroporation and removal of the cell juice. It does not, therefore, as postulated by the Examiner, refer to the liquid juice removed from the electroporated plant cells.

The Examiner states that "the claims have to be reviewed and validated in light of the specification" and applicants agree with that statement. However, when one actually takes the time to consider the meaning of "biological material" as taught in the specification (and as used in the claims) it is abundantly clear that what is being referred to is the plant material that has undergone electroporation, not the liquid juice removed from the electroporated plant cells.

Continuing onward, at the bottom of p. 10 the Examiner refers to Figure 1 of the present application. Applicants submit that their Figure 1 shows means (item #6) for applying alkalinity to the biological material within a perforated screw conveyor during transport. It is technically impossible to transport a liquid material in a perforated screw conveyor specifically designed – as is applicants' screw conveyor – to separate off juice from solid material. It is the focus of the presently described and claimed apparatus to separate juice from the biological material (solid matter) during transport by means of a novel perforated screw conveyor. The term "perforation" (or "perforated") means that there are holes present through which liquid matter, i.e., plant juice, can leave the screw conveyor while the biological material (solid matter) is transported further to the diffusion (i.e., extraction) stage (subsequent step c). The tap for the juice separated off from the biological material (solid matter) in the screw conveyor is shown in Figure 1 as item #7. There is no disclosure to be found anywhere in applicants' specification regarding the alkaline treatment of the juice but not the solid material. Instead, there is a clear teaching to carry out an alkaline treatment of the biological material, i.e., the solid plant matter, which is nowhere taught or even suggested in the prior art in this field.

Further to the above, the Examiner refers at the top of p. 10 to the importance to applicants' claimed method and apparatus of ensuring a mild mechanical impact on the biological materials, i.e., to avoid significantly altering the form and character of such biological material. However, the Examiner then goes on, as indicated above, to argue that the "biological material" may be the liquid that has been separated from the electroporated plant material. This completely ignores the fact, however, that a liquid material cannot be pressed, nor can it be subjected to a mild mechanical impact. Above all, a liquid (identified by the Examiner as the 'biological material') cannot be preserved "unaltered in its form and character" to be consequently supplied to a subsequent alkaline extraction. A liquid does not have a "form" that could be "preserved", i.e., as recited in step b of both independent claims 1 and 18.

Still further, on p. 11 of the Answer the Examiner cites to the text in paragraph [0026] of the present application, which discloses that, "In another variant the alkalinity is introduced when separating off the cell juice in step (b)" (emphasis supplied by applicants). Applicants, however, completely fail to understand how from the mere possibility of alkalinity also being added to the juice separated off from the biological material (solid matter) the Examiner also is able to conclude that the reference teaches to also render the solid material alkaline (i.e., prior to step c in the claimed method). It appears that, once again, the Examiner is relying on a hindsight reconstruction of the invention based on the teachings contained in the present application.

Even further, referring to the Examiner's Responses to (applicants') arguments B and D, i.e., on p. 12 of the Answer, the Examiner again alleges that Eugene teaches to minimize the pressure of any mechanical pressure. As pointed out above by applicants, this is not the case, as the subject reference teaches one to use a variety of presses to press the biological material into a "cake". Clearly, then, such treatment would mean that the solid material is not carried forward "in a substantially mechanically unaltered form". In addition, as also noted above, if the "biological material" were, in fact, constituted of the juice separated from the electroporated material, it would not be possible for such material to be supplied to a subsequent extraction treatment in such a "mechanically unaltered form".

Finally, on p. 13, the Examiner alleges that, "anyone would choose a common well known full screw conveyor to achieve low pressure impact." In response applicants submit to the Board that as is well known in the art, a screw conveyor is normally used for transporting solid materials. The use of such a conveyor for separating off cell juice from biological material (solid matter) is unprecedented in the art. It is, thus, one of the contributions of the presently claimed method and apparatus to convert a common screw conveyor into a juice-separating device. Applicants have provided a perforated screen for the full screw in order to allow the juice dripping from the biological material (solid matter) to leave the full screw and to prevent the juice from entering the subsequent diffusion (i.e., extraction) stage.

For at least the foregoing reasons a reversal of the Examiner's rejection and an early and favorable Notice of Allowability of all of the pending claims is kindly solicited.

No fee is due upon the filing of this Reply Brief. In the event that any fee is due, authorization is hereby provided to charge the required fee to Deposit Account No. 15-0700.

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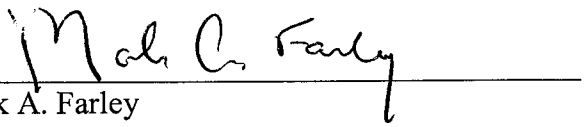
Respectfully submitted,



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